tion, and starts from the principle that "the phenomenon must manifest itself in this, that, *ceteris paribus*, the more distant stars will be redder than the nearer ones." As a measure of redness he employs the difference, photographic *minus* visual magnitude, derived from the Draper catalogue and the Harvard revision. It would be profitless to use direct determinations of parallax, for the material at hand is far too scanty and untrustworthy. Hence he derives the measures of distance from his own statistical discussions, which have enabled him to express the average parallax, of a star as a function of its magnitude and proper motion. The necessary data have thus been found for 1433 stars, and separate equations have been formed for the different spectral classes and certain ranges of proper motion within each class. It is impossible here to follow the rather complicated discussion in detail, but the result obtained on certain simple assumptions as to the nature of the scattering of light implies a loss of

0·00867 of total light = 0·00945 of mag. for photographic rays
0·00427 ,, = 0·00465 ,, visual rays

in the case of a star the parallax of which is 0·1″, or the distance of which is 32·6 light-years. Kapteyn considers that these numbers represent lower limits, and finds no difference between galactic and extra-galactic regions of the sky so far as selective absorption is concerned.

Despite the contradictory nature of the evidence, it must be felt that the whole subject is full of interest. It is now receiving the most critical and exhaustive discussion, and the need for fresh material will stimulate original and appropriate observations. It is pleasant to learn from Prof. Kapteyn that the plan of work for the 60-inch reflector on Mount Wilson includes special provision for this line of study. Efforts directed with a serious purpose and pursued with sincerity do not go unrewarded, though the shape of the reward may not always be according to expectation.

H. C. P.

NOTES.

THE list of Birthday Honours was published on Friday last, but, as usual, men of science do not figure largely in it. Among the new Privy Councillors we notice the name of Sir William Mather, who has done much to promote technical education. The honour of Knighthood has been conferred upon Mr. H. Hall, His Majesty's Inspector of Mines for the Liverpool and North Wales district, and Dr. A. Hopkinson, Vice-Chancellor and principal of the Victoria University of Manchester. Colonel F. B. Longe, Surveyor-General of India, and Dr. R. T. Glazebrook, F.R.S., become Companions of the Bath (C.B.). Mr. J. H. Marshall, director-general of archæology in India, Mr. C. Michie Smith, director of the Kodaikanal and Madras Observatories, and Dr. M. Aurel Stein, superintendent of the Archæological Survey, Eastern Circle, are appointed Commanders of the Indian Empire (C.I.E.). The order of C.M.G. has been conferred upon Dr. A. D. P. Hodges, principal medical officer of the Uganda Protectorate, in recognition of his services in the suppression of sleeping sickness, and Prof. T. W. Edgeworth David, F.R.S., of the University of Sydney. Mr. C. O. Waterhouse, of the British Museum (Natural History), has been appointed a Companion of the Imperial Service Order.

SIR WILLIAM RAMSAY, K.C.B., F.R.S., has been elected an "Associé Étranger" of the Paris Academy of Sciences, in the place of the late Prof. Alexander Agassiz.

THE Albert medal of the Royal Society of Arts for the current year has been awarded by the council to Madame Curie, for the discovery of radium. The discovery, which was the outcome of Prof. Becquerel's researches into the radio-activity of uranium and its compounds, was made jointly by Madame Curie and her husband, Prof. Curie, professor of physics at the Sorbonne, in 1898. Prof. Curie died in April, 1906, and in May of the same year the faculty of sciences paid his widow the distinguished honour of appointing her his successor. She has since continued, on her own account, the researches she commenced in association with her husband. The Davy medal of the Royal Society was awarded to Prof. and Madame Curie in 1903, and the importance of the discovery has been fully recognised by the scientific world.

THE King has consented to become Patron of the Royal Society of Arts in succession to King Edward the Seventh, who became Patron on his accession, after having filled the office of president of the society for thirty-eight years.

THE President of the Board of Trade has appointed a committee to inquire what degree of colour-blindness or defective form-vision in persons holding responsible positions at sea causes them to be incompetent to discharge their duties; and to advise whether any, and, if so, what, alterations are desirable in the Board of Trade sight tests at present in force for persons serving or intending to serve in the merchant service or in fishing vessels, or in the way in which those tests are applied. The committee consists of the Right Hon. A. H. D. Acland (chairman), Lord Rayleigh, O.M., F.R.S., Sir Arthur Rücker, F.R.S., Mr. Raymond Beck, Captain T. Golding, Prof. F. Gotch, F.R.S., Mr. N. Hill, Mr. E. Nettleship, Mr. J. H. Parsons, Prof. J. H. Poynting, F.R.S., and Prof. E. H. Starling, F.R.S. Dr. W. Watson, F.R.S., and Mr. S. G. Tallents will be secretaries to the committee.

WITH reference to Mr. Winston Churchill's statement in the House of Commons on June 16, "that the time has now arrived when a definite effort should be made to break new ground and set up a higher standard" of safety in mines, we learn that a committee, appointed by the council of the Royal Society of Arts, and under the chairmanship of Sir Henry Cunynghame, K.C.B., is now considering the relative merits of a number of life-saving appliances which have been submitted in response to an offer, under the Fothergill Trust, of a gold medal or prize of 20*l.* for the best portable apparatus for enabling men to undertake rescue work in mines or other places where the air is noxious. The committee of the society is in communication with the South Midland Coal Owners Mine Rescue Experimental Committee, which is also conducting exhaustive inquiries with the view of discovering the most suitable apparatus for use in the South Midland coalfields.

THE King held his second Accession Court for the reception of addresses at St. James's Palace on June 22. Among the addresses presented were eight from universities and a number from learned societies. The King made special replies to the Universities of Oxford, Cambridge, Edinburgh, Dublin, and London. To the representatives of Oxford University his Majesty remarked:—"It is my desire to follow the example of my father and of Queen Victoria in sustaining and in fortifying those seats of learning on whose prosperity and influence the character and repute of our civilisation largely depend. Among them the University of Oxford, with its world-famous traditions of steadfastness and loyalty, will ever hold an honoured place." The reply to Cambridge University included the words:—"Your famous University may count upon my sincere goodwill, and, like King Edward, I shall watch its progress and expansion with lively interest. I am convinced that you will not fail in the responsibilities with which you are charged, and that the zeal for truth, love of learning, and a high ideal of character and conduct will ever be cherished and fostered in your midst." To the Edinburgh University representatives the King said:—"It gave me great pleasure to listen to the record which you have recited of the growth and increasing prosperity of the University of Edinburgh, since the time when, as Prince of Wales, my dear father matriculated as a student. The work of the universities is of far-reaching importance to the welfare of my people, and I feel confident that every extension of the sphere of their influence will be attended with beneficent results. I shall follow with deep interest and continual good wishes the work which is being done by your university in furthering the advance of sound learning and education." The reply to London University included the words:—"King Edward watched with keen interest the continuing prosperity and progress of the London University. He understood how much the strength and reputation of our country depended upon the moral and intellectual culture of her sons and daughters. He saw with pleasure the distinction and thoroughness with which the London University invested higher education in the capital. You may be assured that the fortunes of your university will ever be near my heart, and that I shall always take a lively interest in your welfare."

Queen Alexandra received Captain R. F. Scott at Buckingham Palace on Saturday last, and expressed her deep interest in the forthcoming British Antarctic Expedition. Her Majesty presented Captain Scott with a Union Jack to be carried with the expedition, and to be planted at the most southerly point reached. A telegram from New Zealand announces that the Dominion intends to present the expedition with a quantity of coal and other stores on its arrival at Lyttelton. The *Terra Nova* left Madeira on Sunday for Simonstown, where she is due to arrive on August 1. Captain Scott is to sail from Southampton on July 16, and is due to reach Cape Town on August 2, and to leave there on August 13. The *Terra Nova* should arrive at Lyttelton on October 14, set sail on November 15 for the Antarctic, and reach the base on King Edward VII. Land on December 15.

The *Times* correspondent in Berlin states that the preliminary expedition to Spitsbergen for the purpose of studying Arctic conditions in connection with the projected Zeppelin airship Polar expedition will leave Kiel on Saturday next in the North German Lloyd steamship *Mainz*, which has been specially fitted up for the purpose. It is said that Prince Henry of Prussia, as well as Count Zeppelin, will take part in the expedition, which is expected to last some eight weeks.

According to a Geneva correspondent of the *Times*, an important Swiss scientific expedition left last week to make researches in the Cordilleras basin of the Andes. The expedition is in charge of Prof. O. Fuhrmann, of the University of Neuchâtel, and it will probably be absent two years.

Mr. Robert Newstead, lecturer in economic entomology and parasitology at the Liverpool School of Tropical Medicine, and a member of the Entomological Research Committee of the Colonial Office, has gone to Malta to investigate the problem existing there of the menace to health by the sand-fly. The main cost of the expedition will be covered by a special grant from the advisory committee for the Tropical Diseases Research Fund (Colonial Office).

The discovery of an immense reef of free-milling gold ore near Stewart, at the head of Portland Canal, British Columbia, is reported. It is stated that the reef has been traced for nearly twenty miles, and naturally there has been a great rush of miners and others to the locality.

It is stated in the *Scientific American* that a fund has been started by Mrs. E. H. Harriman for the collection of complete data on mammals and other animals in the North American continent, and that Dr. C. Hart Merriam, chief of the Biological Survey of the U.S. Department of Agriculture, is about to resign his position to take charge of the work.

A Reuter message from Algiers states that two violent earthquake shocks were felt at that place, and throughout the west of the department, at 1.30 on the afternoon of Friday last. Later telegrams received in Paris on Tuesday state that earthquake shocks continue to take place in the district of Aumale, that Dowar el Enoch suffered particularly, and that twelve lives have been lost.

We regret to learn of the death, at eighty-one years of age, of Mr. C. Greville Williams, F.R.S., author of many papers in organic chemistry, and for some years assistant to Lord Playfair in the department of chemistry of the University of Edinburgh.

The *Athenaeum* announces the death, at the age of seventy-five years, of Dr. Julius Weingarten, professor of mathematics in the University of Freiburg im Breisgau.

Mr. S. A. Stewart, whose death at the advanced age of eighty-four occurred through an accident at Belfast on June 15, was a distinguished Irish botanist and geologist, and until recently curator of the Museum of the Belfast Natural History and Philosophical Society. Mr. Stewart contributed valuable papers to the Royal Irish Academy and other scientific societies, and wrote in conjunction with the late Mr. T. H. Corry the standard work "A Flora of the North-east of Ireland," brought out in 1888. Although jointly planned, the early death of Mr. Corry a few years before publication left the chief execution of the project to Mr. Stewart. Nearly seven years later a valuable supplement was published by Mr. Stewart in collaboration with Mr. R. L. Praeger in the Proceedings of the Belfast Naturalists' Field Club. Mr. Stewart's contributions to geology were also most original and important. He was an Associate of the Linnean Society, a Fellow of the Botanical Society of Edinburgh, an hon. associate of the Belfast Natural History and Philosophical Society, and one of the founders of the Belfast Naturalists' Field Club.

The *Times* announces that a memorial to Lieut. Boyd Alexander, the explorer, who was murdered in the French Sudan in April, and his brother, Captain Claud Alexander, who also lost his life in Central Africa while engaged in scientific exploration, has just been completed at Wilsley House, Cranbrook. A sheet of water on the estate has been laid out as an exact reproduction in miniature of Lake Chad from plans by Lieut. Boyd Alexander. On the islands and banks of the lake are reproductions of thatched native huts, and there is preserved on the adjacent lawn one of the boats in which the Alexander-Gosling Expedition made its way down the river Yo to the Nile.

A complimentary banquet to some of the recipients of the Mary Kingsley medal of the Liverpool School of Tropical Medicine was given by the chairman of the school on Saturday last, when Surgeon-General Sir Alfred Keogh, C.B., who was one of the speakers, said he had endeavoured to help science in the appointment which he had lately vacated. His special mission was to endeavour to bring into the counsels of the War Office a realisation of the fact that medicine was an applied science, and that it was not concerned merely with the treatment of disease, but with its prevention. The problem of making the tropics habitable was easy, and they could make such countries as West and Central Africa as salubrious as Liverpool if they would only take the trouble to think about it and would organise for the purpose. Medical science had also a definite relation to war. He described the work of Sir David Bruce in practically stamping out Malta fever. Thanks to applied medicine, there had been added to the Indian Army for defensive purposes last year the equivalent of two battalions.

THE Cavendish lecture will be delivered to the West London Medico-Chirurgical Society to-morrow by Sir Thomas Oliver, who will take as his subject "Empyema and some Problems Connected Therewith."

THE summer meeting of the Junior Institution of Engineers will be held in Dublin and Belfast from July 16 to 23. The proceedings are to be opened by a reception at Trinity College, Dublin, by the provost and professors of engineering, and afterwards a number of engineering works, &c., will be visited.

THE autumn meeting of the Iron and Steel Institute will take place at Buxton on September 26 to 30.

THE necessity of applying what may be called the "intensive" method of treating some questions of Indian ethnology is enforced by a paper recently read by Sir R. Temple before the Royal Society of Arts on the people of Burma, and by the discussion which followed. The authorities are at issue on the order of the invasions from which the present population resulted. Sir R. Temple thinks that the order of entrance into the peninsula was Mon-Khmer, Tai or Shan, Bama or Burmese. Sir J. G. Scott believes that the Shan, if they migrated at all, formed the third body of newcomers; but he prefers to suppose that the Shan never migrated. Again, as regards religion, Sir R. Temple treats the vast majority of Burman Buddhists as Animists, Animism taking the form of Nat worship. Mr. E. Colston, on the contrary, holds that though Nat worship may be animistic in origin, it is an integral part of Buddhism, analogous to the Deva worship in Ceylon. These two authorities are again hopelessly at issue in their views as to the period when Hindu influence became powerful in the country.

THE iron styles used for writing in India are interesting, because it is through them that the types of the present scripts have been determined, the circular class of alphabets, like the Oriya or Burmese, depending upon the necessity, in order to avoid breaking the material, of moving the style in a curve, not in a straight line, along the fibre of the palm-leaf. Mr. I. H. Burkill in vol. vi., part i., of the Journal of the Asiatic Society of Bengal for the current year describes a large collection of these styles. He arranges them in no less than thirty-seven types, beginning with the most simple form, like a porcupine quill, and gradually developing into the most intricate and elaborate shapes.

IN the June number of *Man* Mr. T. M. Joyce describes some curious wooden engraved blocks used by the Bushongo of the Belgian Congo for ornamenting their bodies on festal occasions, and for staining palm cloth and embroidery fibres with a red pigment prepared by bruising the wood of a tree known as *tukula*. They are good examples of the work of this naturally artistic race. It is remarkable that, like our mourning rings, the heir of a dead man, acting as chief mourner, distributes a number of these articles to the immediate friends of the deceased as mementoes.

A GOOD example of the rain-making chiefs, to whom Prof. J. G. Frazer first directed attention, is to be found in a paper on such functionaries in the Gondokoro district, White Nile, contributed to the June issue of *Man* by Mr. W. E. Cole. The rain-maker shows considerable shrewdness in his proceedings. He always builds his village on a hill slope, which he knows attracts the clouds. He smears himself with wood ashes, and wears a number of charms. Then he produces a pot in which he keeps his rain-stones, generally pieces of crystal, aventurine, or amethyst, found on the neighbouring hills. These, in the true spirit of mimetic magic, he covers with water, and, taking in his hand a peeled cane split at the top, he beckons towards him the clouds if his people need rain. Sometimes he maliciously diverts the rain-clouds towards some unfriendly tribe. If by chance his incantations fail, he announces that some hostile chief in the neighbourhood has stolen the rain. This often leads to a raid on the offending village, and to many broken heads.

THE Bulletin of the Johns Hopkins Hospital for May (xxi., No. 230) is devoted to an important article by Drs. Crowe, Cushing, and Homans on the results of removal of the hypophysis cerebri, or pituitary body, a small glandular organ at the base of the brain. Methods were elaborated whereby the organ could be removed without injury to the adjacent brain. In dogs the most striking features following removal are development of a state of obesity, alterations in the sexual organs and skin, subnormal body temperature, sugar in the urine, psychic disturbance, and finally death—all of them symptoms which have occasionally been noticed in man in connection with tumours of the pituitary body. The paper makes a very notable addition to our knowledge of the functions of this organ.

THE difficulty of deciding whether butter is genuine or adulterated is illustrated in a paper by Mr. G. Brownlee issued by the Department of Agriculture and Technical Instruction for Ireland. The committee on butter regulations, in their final report, recommended that in the case of any butter giving a Reichert-Wollny number below 24 the presumption should be that the sample is adulterated with foreign fats. As certain Irish butters, known to be genuine, have been found to fall below this limit, an extended set of observations was made. It appears that the chief factor influencing the Reichert-Wollny number is the lactation period of the cows supplying the milk, and that in order to get butter of a more uniform composition the calving of the cows should be distributed more evenly over the year.

THE Department of Agriculture in the Leeward Islands carries out a number of experiments on sugar-cane, the results of which for the past season are now published. Of the varieties examined, some show themselves well suited for cultivation at all the various experimental centres, while others are more limited in their range and are at their best on certain special types of soil. The manurial experiments are mainly on the ordinary lines, but some new ground is broken. Molasses has been tried as a fertiliser with results that justify further investigation. It is not clear that either nitrogen, potash, or phosphoric acid is present in sufficient quantity to account for the increased crops, and the simplest explanation appears to be that the carbohydrate furnishes additional supplies of energy for the nitrogen-fixing bacteria in the soil, and thus leads to a gain in the soil nitrogen.

The methods of picking, drying, and packing hops in Kent are described in some detail by Mr. Arthur Amos in the *Journal of the Board of Agriculture* (No. 2). Mr. Amos writes with a complete knowledge of the subject as a hop-grower, and is also a trained botanist; the article is therefore one of considerable interest. Hop production is a highly specialised branch of farming, requiring much more capital per acre than wheat or cattle production, and it includes not only hop growing, but also drying. The oasts, or drying ovens, are familiar objects to all who have travelled across Kent. The drying is managed by a skilled workman, who remains in charge during the whole time of hop-picking, and even sleeps on the spot so that he may be at hand in case of need. A good hop-dryer is a person of distinction in the village community, and rightly so, since he can by his efforts materially influence the value of the product.

The extraordinary interest shown by the public in poultry production at the present time is discussed in the April number of the Journal of the National Poultry Organisation Society. To a certain extent a section of the daily Press is responsible for this outburst, but the popular interest always existed even before it was recognised by the Press. The society is proposing to take as full advantage as possible of the present favourable opportunities for the introduction of cooperative methods in egg production. It will be interesting to see how far cooperation may become a factor in English rural life.

The *Field* of June 25 contains a summary of an important paper read by Mr. Pocock at the meeting of the Zoological Society on June 21 on the scent-glands of deer and antelopes, and their bearing on the classification of those groups. The author gave reasons for regarding the Indian four-horned antelope as related to the bushbucks rather than to the duikers, while the beira antelope of Somaliland is classed with the dik-diks instead of with the gazelles, and the saiga, the chiru, and the palla are removed from the latter group to independent positions. In the deer it is considered that the form of the antlers does not constitute a trustworthy guide to affinity.

In the May number of the *National Geographic Magazine* Mr. H. M. Smith, the Deputy Commissioner, tells some of the wonderful results which have been accomplished by the Fisheries Commission in re-stocking the depleted waters of the United States with food-fishes, lobsters, oysters, &c. Nearly forty years ago the Government realised the urgent necessity for measures of this nature, and at the present day the official system of fish-culture is stated to surpass in importance and extent that of all other countries collectively. A few States did not join in the movement, with the result that there has been a shortage in the supply of the eggs of certain species. The obvious remedy for this is the assumption by the Federal Government of supreme power in regard to fisheries. For the first ten years of its existence the energies of the commission were concentrated on the culture of the eight commonest and most valuable food-fishes. Nowadays the list is six times as large, and includes shad, whitefish, Pacific salmon, white perch, yellow perch, cod, various kinds of flat fish, and lobsters. The hatcheries also rear numerous kinds of fresh-water species. The only permanent marine hatcheries are in Maine and Massachusetts, where, to use the author's own words, such species as cod, pollock, flat-fish, and lobsters are reared and distributed by the billion. Special attention is likewise directed to the diseases of fishes, particularly cancer, for which new laboratories are in course of erection. The article concludes with an account of new fisheries and new methods of fishing discovered by the commission.

In an article in the June number of the *Zoologist* Mr. F. J. Stubbs endeavours to explain the mechanism by which aquatic birds are enabled to maintain themselves at different levels in the water. Moorhens, it is well known, will not unfrequently maintain themselves at a considerable depth below the surface by grasping plants with their toes, and it is suggested that the same means are sometimes employed by dabchicks. It is obvious, however, that such a method will not hold good for divers, in which grasping power is lacking. The mechanism, in the author's opinion, is afforded by the presence of a layer of air held between the "feather-film"—or mesh of barbules and cilia formed by the outer layer of the plumage—and the skin. "Each of the contour-feathers is provided with a separate apparatus of muscles, whereby it can be held out at right angles or pressed close to the body. In the first case the bird would appear round and fat, in the second very slim, and there would be a corresponding change in the extent of the air-envelope, and consequently of the buoyancy of the bird. By adjusting the thickness of this layer of air between the 'feather-film' and the epidermis the bird can alter its specific gravity." It is further considered that the water-repelling property of the plumage of a duck is due to the feather-film, and not to the natural oiliness of the feathers.

We have received a series of contributions from the Palæontological Laboratory of Yale University, reprinted chiefly from the *American Journal of Science*. This department of the Peabody Museum, which became famous through the researches of the late Profs. O. C. Marsh and C. E. Beecher, well maintains its reputation under the direction of Prof. Charles Schuchert. The most important paper is one by Dr. G. R. Wieland describing in detail the remarkable Cretaceous turtle, *Archelon ischyros*, which has now been mounted for exhibition and measures considerably more than three metres in length. A discussion of this and allied Cretaceous fossils seems to show that the curious leathery turtles are the degenerate descendants of ordinary turtles. Baron F. von Huene and Dr. R. S. Lull publish a photograph and sketch of the original specimen of the small Triassic Dinosaur, *Nanosaurus agilis*, showing that it is much less satisfactory than might be supposed from Prof. Marsh's description. Prof. T. D. A. Cockerell and Dr. H. F. Wickham describe many insects and plant-remains from the Miocene of Florissant, Colorado; while Prof. Schuchert himself discusses a series of Silurian fossils from Arisaig, Nova Scotia, carefully collected by Mr. W. H. Twenhofel.

The "Extracts from Narrative Reports of Officers of the Survey of India," for the season 1907–8, contain an interesting account of precise levelling carried out with the American binocular level. This instrument differs from levels of the ordinary form in several important particulars. It is provided with a second telescope, through which the bubble can be viewed and the scale reading at each end of the bubble observed at the same time as the staff reading is taken. The advantage of this is obvious, as the change in the position of the observer between the two readings, necessary in the older form of level, is almost certain to cause some shift in the position of the bubble. The staff is graduated on one face only, while the telescope diaphragm carries three horizontal wires instead of the usual single one. The two outside wires are equidistant from the centre one, and in making an observation all three wires are read. The necessity of having a second set of staff graduations on another face with a different zero and in different units is thus obviated, while the three readings form at least as effective a check against errors, and are more rapidly performed than the two required on the older system. The American instrument presents the additional advantage that the interval, as read on the staff, between the wires gives a measure of the distance of the staff from the observer. As an illustration of the precision of which levelling is now capable we may take the Bombay-Madras line. The length of this line is 806 miles, and the closing error was 0·607 foot, or about 1/100 inch per mile. A closely comparable figure could be derived from other lines. Taking another test of precision, viz. the difference in the results of two observers each making a single traverse of the same line, we arrive at a figure of about 1/20 inch per mile.

In our issue of December 23 last we briefly alluded to an interesting paper, by Mr. W. G. Reed, jun., on South American rainfall types, recently read before the Royal Meteorological Society. The author constructed a map of very large size, making use of all published data, and from an inspection of the curves it was seen that (generally speaking) there is a marked division of the rainfall into the following five types:—(1) double maximum, including the region north of the Amazon and west of Dutch Guiana; (2) maximum early in the year, including Guiana and the northern part of Brazil, except the coast region; (3) winter maximum, in the northern coast States of Brazil, also on the west side of the continent south of the equator and west of the Cordillera; (4) summer maximum, extending over central and southern Brazil, Bolivia and Paraguay, and as far south as Buenos Aires; (5) rain at all seasons, embracing the southernmost States of Brazil, Uruguay, south of Buenos Aires, and east of the Cordillera. Small graphs are drawn for stations exhibiting general types of the annual range of rainfall applicable to each of the large divisions. The author also compares his own map of seasonal rainfall with those previously published, preference being given to that by E. L. Voss contained in *Petermann's Mitteilungen*, 1907.

THE University of Wisconsin has issued an account of some instructive experiments on manuring which, while not new in principle, will be of value to agricultural lecturers. The sandy soils of northern Wisconsin are deficient in humus and in nitrogen, both of which could be applied as dung or purchased organic fertilisers. It is, however, much cheaper, and distinctly more effective, to grow a crop of clover on the soil during the previous year, and then to plough it in. The New Mexico Agricultural College has published a bulletin describing the methods of apple culture under irrigation. Apples will grow in a great variety of circumstances, and can be produced in regions lying outside the old apple belt if methods like irrigation are adopted.

THE *Electrician* for June 10 contains a supplement of 160 pages devoted to the applications of electricity to marine work. Already a large proportion of the auxiliary power required on a modern liner or battleship is supplied electrically, but the electrical engineer looks forward to the near future when electricity will play an important part in the propulsion of vessels. Three possible systems of electro-mechanical propulsion are described in this supplement. In each the prime mover is coupled direct to one or more dynamos, which in turn drive motors on the screw shafts. The great flexibility of the electrical method of transmission makes it possible to vary the speed of the vessel between wide limits without running the machinery at low efficiency. The question of the prime mover of the future is obviously an important one, and several of the writers of the articles expect the oil engine to displace the turbine, just as the turbine has displaced, or rather is displacing, the reciprocating steam engine.

A NEW petrol-electric motor omnibus, constructed by the Daimler Company, is illustrated in the *Engineer* for June 24. Two power units are fitted, one at each side of the frame under the seat line, each capable of developing 12 horse-power. The engines are of the new Daimler type, with crank shafts and frames extended for the dynamotors, by which term is meant an ordinary continuous-current dynamo which is also used as a motor. Each dynamotor is normally rated at 3 kilowatts, but has a give-and-take capacity of three to four times this rating. It is stated that on ordinary greasy roads it is found almost impossible to cause this new omnibus to skid or side-slip to any appreciable degree, and nothing in the nature of a dangerous side-slip has been experienced in 5000 miles' driving. This immunity is attributed to the following factors:—the extreme flexibility of the double-unit system; the better weight distribution obtainable by the construction adopted; the distribution of braking over the front and rear wheels, and the improved methods of braking employed; the improved co-axial pivot steering; and the comparative absence of unsprung weight. The total weight of the vehicle, complete and ready for running, is 3 tons 9 cwt., the regulations allowing 3 tons 10 cwt.

OUR ASTRONOMICAL COLUMN.

METEORITE AT BOMBAY.—Mr. W. F. Denning writes:—"Advices from India mention the fall of a brilliant fireball at Bombay on the afternoon of April 25 last, at 4.15 (standard time). One observer says the meteor flashed out three times in a descent nearly vertical, and the appearance suggested huge drops of fire from a Roman candle. A few minutes later there was a report as loud as one of the harbour guns, only more muffled, and the impression was that a big mine had exploded in the neighbourhood of Khandalla.

"At Lauovli a loud rumbling sound startled the inhabitants, the houses being shaken. Looking upward, people saw a long thin line of smoke rolling from the S.W. to N.E. across the sky. Further reports indicate that the fiery ball shot up from the direction of the sun.

"Other observers at Bombay say that the detonation resembled a blasting operation, heard for many miles around, and lasting nearly a minute. The meteor appeared as a white-hot ball, and it left a long, luminous trail. On striking the surface of the Bombay Harbour it threw up a high column of water with steam.

"At Khandalla a terrific noise was heard proceeding from the direction of Poona.

"It is doubtful whether the object really descended in Bombay Harbour, as one observer says, though it gave that impression, yet it evidently fell far beyond that spot. Directed from the S.E. sky, the radiant was probably in Leo, but the height of the meteor cannot be precisely ascertained from the data available. This is the third brilliant meteor seen in sunshine during the last nine months. Others were reported in England on October 6, 1909, and May 10, 1910.

"The region of Leo seems to be a prominent one for the supply of unusual meteors."